Strikethrough Version of Amended Claims

1. (amended) The device for producing magnetized water according to Claim ~~3~~2, wherein said first and second coils are enwrapped with a shield screen to cut off harmful electromagnetism which can be generated while said pulsating magnetism is induced.

11. (amended) The device for producing magnetized water according to Claim 5~~6 or Claim 10~~, wherein a cooling pan is placed outside said condenser and said chamber.

12. (amended) The device for producing magnetized water according to Claim 10~~11~~, wherein said partition board has a number of holes dug in it.

13. (amended) The device for producing magnetized water according to ~~any one of~~ Claims 1 ~~through 10~~, wherein said coils and said means of supplying power respectively have a counter-electromotive force cut-off circuit formed to cut off the counter-electromotive force caused by said coils.

14. (amended) The device for producing magnetized water according to ~~any one of~~ Claims 1 ~~through 10~~, wherein said means of supplying power converts alternating current of electricity into DC pulsating signals pulsating at three through seven Hz ~~per second~~ and outputs the same.

15. (amended) The device for producing magnetized water according to Claim 1~~1~~4, wherein said chamber is made of nonferrous metal materials.

18. (amended) The method for producing magnetized water according to Claim 16 ~~or Claim 17~~, wherein said pulsating magnetism is in the range of 600 through 1,000 gauss in intensity.

19. (amended) The method for producing magnetized water according to Claim ~~18~~16, wherein said pulsating magnetism is in the range of frequency of three to seven Hz ~~per second~~.

BACKGROUND OF THE INVENTION

1. ~~TECHNICAL FIELD~~Field of the Invention

The present invention relates to a device and a method for production of magnetized water and, in particular, to a device and a method for its production by making use of the phenomenon that molecules of water form clusters and concentrate themselves in a field of pulsating magnetism.

2. ~~BACKGROUND ART~~Description of Related Art

Magnetized water is ~~by nature the~~ more significant for showing the characteristics of a peculiar water through change of the arrangement of its molecules under the influence of magnetism than the fact that its molecules gain a magnetic trait by magnetization., ~~and thereupon~~ ~~v~~Various studies and researches have so far been made about the physicochemical characteristics of magnetized water.

For example, it has been reported that when water is magnetized and used in ~~the~~ industries, the scale caused by the water inside pipes decreases. ~~and that~~ ~~i~~If magnetized water is used in rinsing mouths, fewer dental calculi result. For another example of biological reactions in living bodies, there has been a report that in magnetized water the activity of glutamate decarboxylase is greater by some 30% than in ordinary water., ~~and so have~~ ~~t~~There have been many other reports on the virtues of magnetized water.

~~In especial, many~~ Much researches ~~have~~has been made of uses of molecules of water in living bodies., ~~and~~ ~~i~~It is known that, in most processes of metabolism in a living body, such biochemical reactions as syntheses and degradation of protein or nucleic acid, as well as storage and release of energy, take place through the reactions of molecules of water in the processes of their rearrangement. However, it is also known that such biochemical reactions of molecules of water do not take place by molecules of water in direct reaction with other biological substances. ~~but some~~ sSuitable solutes, which ~~have~~

functions as a buffer, are necessary for ~~them~~the reactions to take place. Water, a main solvent in a living body, has such solutes dissolved in it, such as Na^+, $K\sout{a}^+$, Ca^{++}, Mg^+, Zn^{++}, Fe^-, $SO4^-$, $PO4^-$, Cl^-, etc., playing the role of a buffer by keeping the solvent's pH or osmotic pressure to a certain level.

~~What needs to notice here is that the above-listed~~ These solutes are capable of reacting with molecules of water and changeing their arrangement.

To explain in further detail, a sodium ion, Na^+, and a potassium ion, $K\sout{a}^+$, bring about in a living body quite opposite biochemical reactions. ~~On the one hand, the former,~~ Na^+, by ~~a~~ reaction with molecules of water, assumes an arrangement~~,~~ whereby ~~it~~the Na^+ is encircled by these water molecules, resulting in dispersion of ~~them~~ the water molecules to assemble around ~~itself~~the Na^+, causing ~~this way~~ a swelling of the arrangement of molecules of water. ~~Whereupon,~~The water's osmotic pressure increases, ~~and this way, too,~~ weakening the dipolarity of water by forcefully attracting the molecules of water, ~~to be~~ followed by a decrease of the water's reaction with other solutes.

~~On the other hand, the latter, potassium ion,~~ $K\sout{a}^+$~~,~~ assumes an arrangement ~~in the form of~~ encircling molecules of water~~.,~~ ~~and thus, by~~ gGathering ~~them~~ the molecules of water close together group by group~~,~~ forms clusters of molecules of water.

~~Lately, a~~According to the results of ~~the~~ studies through NMR (nuclear magnetic resonance) of the clusters of molecules of water existing on the inner walls of endoplasmic reticulum or mitochondria in living cells, it has been learned that, compared with the constituents of the substrate of a cell, the clusters of molecules of water are in greater concentration~~.,~~ ~~and~~ tThis can be explained by stating that potassium ions, $K\sout{a}^+$, concentrate the clusters of molecules of water and facilitate the reaction of the resultant concentrated molecules of water with structures of endoplasmic reticulum or mitochondria within cells. Accordingly, it can also be said that a smooth intercellular metabolism takes place through the phenomena of concentration of the clusters of molecules of water.

~~DISCLOSURE OF THE INVENTION~~SUMMARY OF THE INVENTION

~~In the present invention, accordingly, it is intended to provide~~Embodiments of a device and a method ~~therewith~~ for production of magnetized water ~~good~~ for ~~the~~ metabolism in a living body is described. ~~by changing~~ ~~t~~The arrangement of molecules of water may be changed by a pulsating magnetic field~~, without the help of any inorganic substances~~, ~~but~~ through formation ~~thereby~~ of ~~the~~ clusters of molecules of water, ~~their~~and the concentration~~,~~ and maintenance of ~~their~~ magnetic properties for a certain length of time.

A device for production of magnetized water may include a chamber, which houses a vessel containing purified water, an outer wall of which is wound with coils of wire by a certain number of rounds; a means of supplying power, which converts alternating current into a series of pulsating direct current signals with a preset frequency to impress said coils in order to generate a pulsating magnetic field inside said chamber; a means of cooling placed outside said chamber to cool heat caused by said coils; a means of sensing temperature to detect changes of temperature caused by said coils; a means of measuring time to measure time of magnetization of said purified water; and a means of control, which compares the time spent on magnetization with a preset time. Said power supply means breaks off the impression of said pulsating DC signals when a preset time is reached.

The device may further include a water tank placed outside and coupled to said chamber. The water tank may receive a supply of water from an outside source. The water in said tank is magnetized in said chamber and circulated to said tank. Said tank may also include a means of outlet to discharge the magnetized water outside with ease.

A method for production of magnetized water may include a magnetism having a certain intensity and pulsating frequency with a preset frequency. The magnetism is

impressed on purified water contained in a tightly closed vessel. The impression with said magnetism is continued as a spin arrangement of the molecules of water keeps unchanged. The molecules of water are made to form clusters, whereby enriched magnetized water is obtained.

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BRIEF DESCRIPTION OF DRAWINGS

Objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the accompanying drawings in which:

Fig. 1 is a drawing to illustrate ~~the~~a device for production of magnetized water in Embodiment Example 1 ~~of the present invention~~.

Fig. 2 is a waveform diagram of the voltage on a first coil in Embodiment Example 1.

Fig. 3 is a waveform diagram of the voltage induced on a second coil in Embodiment Example 1.

Fig. 4 is a drawing to illustrate ~~the~~a device for production of magnetized water in Embodiment Example 2.

Fig. 5 is a drawing to illustrate ~~the~~a device for production of magnetized water in Embodiment Example 3.

Figs. 6 and 7 are ~~the~~ drawings ~~for explanation~~ of ~~the~~ magnetic relaxation time ~~in the present invention~~.

Fig. 8 is a drawing ~~for explanation~~ of ~~the~~ time spent on magnetization ~~in the present invention~~.

Figs. 9a through 9f show ~~the~~ changes in ~~the~~ viscosity of water ~~in the present invention~~.

Figs. 10a and 10b show ~~the~~ conductivity rates of ~~the~~ magnetized water ~~in the present invention~~

Figs. 11a and 11b show ~~the~~ solubility of ~~the~~ magnetized water ~~in the present invention~~.

Fig. 12 is a table ~~to explain the~~of oxygen solubility of ~~the~~ magnetized water ~~in the present invention~~.

Fig. 13 is a table ~~to explain the~~of free radical activity of ~~the~~ magnetized water ~~in the present invention~~.

While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail. The drawings may not be to scale. It should be understood, however, that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the intention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the present invention as defined by the appended claims.

~~BEST MODE FOR CARRYING OUT THE INVENTION~~DESCRIPTION OF PREFERRED EMBODIMENTS

~~To attain the above-said objective, the device for production of magnetized water of the present invention is characterized in that it comprises a chamber, which houses a vessel containing purified water in it, and the outer wall of which is wound with a coils of wire by a certain number of rounds; a means of supplying power, which converts alternating current into a series of pulsating direct current signals with a preset frequency to impress said coils in order to generate a pulsating magnetic field inside said chamber; a means of cooling placed outside said chamber to cool the heat caused by said coils; a means of sensing temperature to detect changes of the temperature caused by said coils; a~~

~~means of measuring time to measure the time of magnetization of said purified water; and a means of control, which compares the time spent on the actual magnetization with the preset time for it and has said power supply means break off the impression of said pulsating DC signals directly the preset time is reached.~~

~~The device is also characterized in that, besides the above-listed basic constituents, it further comprises a water tank which, placed outside said chamber but connected with it, which receives the supply of water from an outside source; and that the water in said tank is magnetized in said chamber and thereafter the magnetized water is circulated to said tank, said tank having a means of outlet, too, to discharge the magnetized water outside with ease.~~

~~The method for production of magnetized water in the present invention is characterized in that a magnetism having a certain intensity and pulsating with a preset frequency is impressed on the water purified and contained in a tightly closed vessel, the impression with said magnetism is continued so long as the spin arrangement of the molecules of water keeps unchanged, and this way the molecules of water are made to form clusters, whereby enriched magnetized water is obtained.~~

~~Below, the invention is described in further detail, the attached drawings being referred to each time.~~

Fig. 1 ~~being a drawing for description of the~~illustrates Embodiment Example 1 of a device for production of magnetized water ~~in Embodiment Example 1. of the present invention,~~ ~~s~~Said device ~~is constructed~~may include, as is shown in the drawing, ~~of a~~ chamber 4, which houses a vessel to contain purified water inside. ~~and which~~ Chamber 4 ~~is~~may be wound with coils of wire by a certain number of rounds. ~~;~~ The device may also include ~~a~~ power supply section 6, which converts ~~the~~ alternating current (AC) of electricity into pulsating direct current (DC) signals for impression on said coils ~~in order~~ to induce a magnetic field ~~to the~~ inside of said chamber 4. ~~;~~ ~~a~~ ~~c~~Cooling section 8, ~~;~~ may be placed outside said chamber 4 to cool the heat caused by said coils. ~~;~~ ~~a t~~Temperature

sensing section 10 may be used to detect changes of ~~the~~ temperature caused by said coils.~~;~~ ~~a~~ tTime measuring section 12 may be included to measure the time spent on magnetization of the purified water.~~;~~ ~~and a~~ cControl section 14 ~~to~~may control said power supply section 6 in accordance with the temperature detected by said temperature sensing section 10 and the time of magnetization measured by said time measuring section 12.

Chamber 4 may be of a vertical structure large enough to house a vessel (e.g., a 1-liter PET bottle). Chamber 4 may be formed of nonferrous metals capable of inducing magnetism of a proper intensity.

~~It is preferable to place~~An embodiment may include ~~a~~ counter-electromotive force cutoff circuit 16 between said coils and power supply section 6~~, whereby~~ to block intrusion of counter-electromotive force ~~which is given rise to by~~from said coils and to shield said power supply section 6 ~~from it~~.

~~Of coils, in order t~~To minimize ~~the~~ magnetic field offset effects ~~which are to be occasioned~~ at ~~the~~a central part of said coils by ~~the~~ influence of ~~the~~ polarity, ~~a~~ second coil 2 ~~is~~may be connected in series, at an interval P, with ~~a~~ first coil 1, which receives said pulsating DC signals from said power supply section 6.

~~The f~~First coil 1 and said second coil 2 ~~are~~may be ~~en~~wrapped with a shielding screen to block ~~off the~~ counter-electromotive force ~~which is given rise to~~ when the pulsating magnetic ~~filed~~field is induced.

~~The chamber 4 will be of a vertical structure large enough to house a vessel of the size of 1-liter PET bottle, and it will be formed of nonferrous metals to be capable of inducing magnetism of a proper intensity.~~

~~The p~~Power supply section 6 ~~is so constructed as to~~may convert ~~the~~ alternating current into a direct current ~~of~~ about 16~ to about 24V ~~for~~ supply for ~~the~~ peripheral devices, (e.g., said cooling section 8).~~,~~ Power supply section 6 may generate a sufficient

pulsating magnetic field in a short time~~,~~ and convert said alternating current into DC signals pulsating at about 3~ to about 7 Hz ~~per second.~~ ~~to~~ The DC signal is input ~~them~~ to said first coil 1, lest the counter-electromotive force which is generated inside the coils should offset said generated magnetic field.~~,~~ ~~while it is preferable to provide both~~ ~~t~~The inputting and outputting terminals may be provided with a double fuse device for ~~the sake of an~~ operator~~'s~~ safety.

~~The c~~Cooling section 8 ~~is~~may be placed outside said chamber 4. Cooling section 8~~,~~ ~~comprising~~may include an air-cooling ~~pan~~fan and a circulatory air-passage (not shown in the drawings).

~~The operation of the device in Embodiment Example 1, constructed as above, is described below.~~

~~After a~~A tightly closed vessel containing purified or twice-filtered water ~~is~~may be placed in said chamber 4.~~,~~ ~~p~~Power is turned on~~,~~ and ~~a~~ power supply section 6 converts the alternating current (AC), supplied under the control of said control section 14, into DC signals pulsating at about 3~ to about 7 Hz ~~per second.~~ ~~to~~ The DC signals are input ~~them~~ to said first coil 1.

When said pulsating DC signals are impressed on said first ~~C~~coil 1, a magnetic field with an intensity ~~to satisfy~~in the range of about 640~ to about 1,000 gauss and pulsation in the range of about 3~ to about 7 Hz is generated inside said chamber 4. ~~by virtue of the intermission of said pulsating DC signals. At this time the~~A waveform of the voltage of the pulsating DC signals impressed on said first coil 1 is ~~as~~ shown in Fig. 2.~~,~~ ~~that on a~~The voltage of the pulsating DC signals on said second coil 2 ~~being as~~is shown in Fig. 3.

When ~~such~~ a pulsating magnetic field, ~~as~~ induced ~~the way~~as described above, is generated in repetition for a given length of time, ~~the~~an arrangement of the molecules of the purified water contained in said vessel inside said chamber 4 ~~sharply~~may substantially

changes as time passes,. but aAt a certain length of time this change slows down and reaches the stage of saturation. At this time tThe molecules of water form clusters and a phenomenon of condensation occurs. Now tThe time required for the arrangement of the molecules of water to reach saturation is termed the magnetization time.

Such a phenomenon is distinct in that tThe spin arrangement of hydrogen atoms persists, from the phenomenon of magnetic resonance, in which the hydrogen atoms undergo a spin arrangement under strong magnetism for an instant but immediately to return to their original state. In this case, the hydrogen atoms exert an influence on the hydrogen ions peculiar to the dipolarity of the molecules of water and thereby the distances between the hydrogen atoms gradually decrease. This can be seen from the analysis of the NMR (nuclear magnetic resonance) by the factin that the magnetic relaxation time, i.e., the time for the molecules of water to return to their original state by their rearrangement, increases. In the air, the molecular arrangement of magnetized water returns almost to its original state in about 24 hours.

In an embodiment, Tthe magnetization time in the present invention, it has been learneddetermined though experiments, ismay be preferably to be set atfrom about 6~ to about 24 hours.

_The magnetization time ismay be preset at said control section 14. in advance and sSaid control section 14 observes to seedetermines whether the time measured at said time measuring section 12 is past the preset time for magnetization.

_If, as a result of this observation the measured time is over the preset time, said control section 14 controls said first coil 1 to stop impression of said DC pulsating signals on said first coil 1.

When magnetization of water is performed by impression of pulsating DC signals on said coils this wayas described above, heat is generated in said first and second coils 1, 2 which raises the temperature inside said chamber 4,, and iIf the temperature inside said

chamber 4 goes beyond a certain ~~degree~~temperature~~,~~ (e.g., 30°C), said temperature sensing section 10 may sends ~~off~~ a warning signal.

In response to said signals from said temperature sensing section 10, said control section 14 ~~so~~ controls said power supply section 6 such that the latter will impress a driving signal to said cooling section 8. This way the temperature inside said chamber 4 ~~is~~may be maintained consistently at a desired level.

~~Next,~~ Fig. 4 ~~is an illustration to describe the~~illustrates a device for production of magnetized water according to Embodiment Example 2. ~~of the present invention, and the device is in the basic idea the same as that of Embodiment Example 1.~~

~~The~~In this embodiment, a device, similar to ~~in this example is the same as~~ Example 1, may ~~in that it comprises~~include a chamber which houses a vessel containing purified water. The chamber may be ~~and which is~~ wound with coils on its outside by a certain number of rounds.~~;~~ ~~a~~ A shielding screen ~~to~~may cover said coils.~~;~~ ~~a~~ A power supply section~~,~~ ~~which~~may converts the originally ~~alternating current of~~AC electricity into pulsating DC signals and impresses them on said coils to induce a magnetic field to the inside of said chamber.~~;~~ ~~a~~ A temperature sensing section may be used to detect ~~the~~ changes of temperature caused by said coils.~~;~~ ~~a~~ A time measuring section may be used to measure the magnetization time of said purified water.~~,~~ ~~and a~~ A control section~~, which~~ may ~~so~~ controls said power supply section to impress pulsating DC signals on said coils according to ~~the~~a temperature sensed by said temperature sensing section and the time measured by said time measuring section. Accordingly, ~~superfluous~~ repetitive detailed descriptions of similar components of Example 1 and Example 2 are omitted.~~,~~ ~~while as to t~~The same ~~constituents the same numbers~~ reference numbers or symbols are used for the sake of convenience.

~~The~~A main characteristics of ~~the~~a device in this ~~example~~embodiment is the ~~lie in that a way~~method of cooling by compression of a refrigerant by evaporation ~~is adopted, instead of the air-cooling method in Example 1. That is, a~~ As shown in Fig. 4, a device

may include cooling pipe 20, serving as a vaporizer, ~~is set~~ in the form of a screw between said chamber 4 and ~~a~~ coil 3.~~,~~ ~~and this~~ ~~c~~Cooling pipe 20 ~~is~~may be connected by ~~a~~ connection pipe 28 ~~with~~to ~~a~~ compressor 22 and ~~a~~ condenser 24.~~,~~ ~~whereby the~~ ~~r~~Refrigerant issuing from said cooling pipe 20 ~~can~~may ~~be resupplied to~~resupply said cooling pipe 28 through said compressor 22 and said condenser 24 to augment the cooling.~~,~~ This may result~~ing is a~~in more efficient cooling ~~than otherwise~~ of the ~~heat of~~ coils and maintain the temperature of the magnetized water in the vessel in said chamber 4 at its proper level (e.g., from about 4°C~ to about 8-°C).

~~In order further t~~To further improve ~~the~~ cooling efficiency, ~~a~~ cooling ~~pan~~fan 26'~~,~~ ~~26"~~ ~~is~~may be placed ~~on the~~ outside ~~respectively~~ of said coil 3 wound round said chamber 4. Cooling fan 26" may be placed outside ~~and~~ said condenser 24.~~ in an ordinary way, whereby,~~ ~~i~~In addition to said cooling by compression by vaporization of said refrigerant, ~~a~~ secondary cooling can be performed by ~~these~~ cooling ~~pans~~fans 26' and 26". In this ~~example~~embodiment, it ~~is~~may not be necessary to divide said coil 3 in two~~, as was dine in Example 1,~~ because of the increased cooling ~~is thus much more~~ efficient~~cy in this example~~.

~~Further, to house all these additional constituents, a~~In Fig. 4, case 30 ~~is~~may be formed to house the abovementioned constituents.~~,~~ ~~which has~~ Case 30 may include ~~a~~ partitioning board 36.~~ inside it, the s~~Spaces ~~above and below~~ said partitioning board 36 ~~are respectively made into a~~may form magnetizing chamber 32. Space below said partitioning board 36 may form ~~and a~~ cooling chamber 34. ~~Here in s~~Said magnetizing chamber 32 may house ~~a~~ chamber 4 wound with said coil 3, ~~and~~ said cooling pipe 20 ~~pipe, as well as~~and said cooling ~~pan~~fan 26'.~~ are placed, while in s~~Said cooling chamber 34 may house said compressor 22, said condenser 24, and said cooling ~~pan~~fan 26" ~~proximate~~are placed on the floor a lower part of case 30.

~~The~~An upper part of said case 30~~, that is~~, housing said magnetizing chamber 32, ~~is cut out to provide~~may include an opening as large as ~~the~~a diameter of said chamber 4~~, just enough~~ to allow ~~bring in~~placement and ~~out~~removal of said vessel of water.~~,~~ ~~while~~

~~s~~Said opening ~~has to have~~may include a lid capable of opening or closing ~~at will~~ for ~~the purpose of~~ protection of the magnetizing space and ~~of~~ prevention of accidents ~~which might possibly be caused by inadvertency of an operator at work~~.

~~The p~~Partitioning board 36 ~~preferably has~~may include a number of ~~holes~~openings for exhaust of heat and drainage of water.~~,~~ ~~and~~ ~~s~~Said magnetizing chamber 32 and said cooling chamber 34 ~~have to~~may be ~~of a structure good~~formed for smooth circulation of air.

For efficient operation and ease of use,~~its easy observation~~ said control section 14 ~~is~~may be placed at a ~~proper~~ position in the front or a side of said case 30.~~,~~ ~~and~~ ~~s~~Said control section 14 (See Fig. 1) ~~is of~~may include, for example, ~~an ordinary structure of~~ a panel (not shown in the drawings).

~~On t~~The bottom of said case 30 may be fitted with three or more castors ~~are fitted~~ for ~~its~~ substantially easi~~ery~~ movement of case 30~~about~~.

~~The o~~Operation of the device in Embodiment Example 2 ~~of the present invention~~ is ~~basically the same as that~~substantially similar ~~of~~to the device in Example 1, except ~~that~~ said coil for impression of the pulsating DC signals from said power supply section 6 (See Fig. 1) ~~is~~may be single in Example 2. Therefore,~~and not plural in number, wherefore its~~ a detailed description of the operation of Example 2 is omitted here.

Fig. 5 ~~is for~~ illustrate~~sion of~~ Embodiment Example 3. ~~of the present invention, in which~~ ~~t~~The device for production of magnetized water according to Embodiment Example 2 above is ~~in~~for use in the home or offices.~~;~~ ~~where,~~ ~~t~~The basic idea of production of magnetized water is substantially the same ~~as that in the cases~~ of the devices in Examples 1 and 2. The same reference numbers and symbols ~~as~~ used in these earlier examples are ~~therefore~~ in use in the descriptions below~~of this example also~~.

~~The device in this example is characterized, however, by~~In Embodiment Example 3, ~~a specific construction, in which it has inside~~ said magnetizing chamber 32 contains ~~a~~ water tank 18, separate from said chamber 4, for production of magnetized water~~.~~, ~~whereby the w~~Water in said tank 18 is magnetized in said chamber 4, restored in said tank 18, and made available outside through an ordinary faucet 38.

~~Below, the device in Embodiment Example 3 is described in further detail.~~

~~In the~~an ~~upper part of said case 30, which is divided into said magnetizing chamber 32 above and said cooling chamber 34 below, viz., in the~~An upper part of said magnetizing chamber 32 ~~is~~may include ~~placed a~~ water tank 18~~,~~ for storage of water~~.~~, ~~which is connected with~~ Water tank 18 may be coupled to said chamber 4 by ~~a~~ connection pipe 28' joined to its upper and lower parts. ~~On said c~~Connection pipe 28', which connects said chamber 4 and said water tank 18, ~~is placed a~~may include circulatory pump 40~~, which is not merely~~ for drawing ~~the~~ water from said water tank 18 ~~but also~~and for sending it back after magnetization for storage in said water tank 18. ~~If not shown in Fig. 5, it is so structured that s~~Said water tank 18 ~~is~~may be automatically supplied with water from an outside source~~.~~, ~~and that this~~The supply ~~will~~may have to be mechanically controlled through ~~a~~ constant measurement of the water in said tank 18 ~~in order that it may always keep~~to maintain a certain quantity of water or magnetized water stored in it.

~~At one side on t~~The bottom of said water tank 18~~,~~ ~~a~~may include drain pipe 28" ~~is connected~~ for discharge of the magnetized water though said faucet 38~~.~~, ~~and s~~Said drain pipe 28 ~~has a~~may include cooling pipe 20 ~~attached~~coupled to it for cooling the water being drained.

~~On s~~Said chamber 4 ~~in this example, too,~~include ~~a~~ coil 20 ~~and a shielding screen, are set, as were in Example 2 above, while a~~A ~~power supply section, a control section, a time measuring section, a temperature sensing section, a counter electromotive force cut off circuit, etc., are~~may ~~also placed~~be included ~~as described previously., whose~~

~~Redundant detailed descriptions of construction and operation are omitted from description here as they are the same as in Embodiment Examples 1 and 2.~~

~~Meanwhile, though Fig. 5 shows the~~an ~~arrangement of a compressor, a condenser, a cooling pan, etc., inside said cooling chamber 34 formed in the lower part of said case 30,, as in Embodiment Example 2, it is also preferable to have. The embodiment may also include a cooling pan inside the aforesaid magnetizing chamber, too.~~

~~Moreover, it is preferable in this example also to have castors (not shown its the drawings) under said case 30 for a smooth movement of this particular item of equipment, while said control section, preferably structured in a panel, can be attached to the front or on a side of said case 30 to secure a handy operation of the device and its quick observation.~~

~~Now the operation of the device in Embodiment Example 3 is basically the same as that of the device in Examples 1 and 2.~~

~~Only, in this example, s~~Said water tank 18 ~~is~~may be provided separately from said chamber 4 to receive a supply of water from an outside source. Said tank 18 may ~~and~~ also restore the water after ~~its~~ magnetization in said chamber 4. ~~Here, s~~Said circulatory pump, which circulates the magnetized water, ~~is~~may be controlled by said control section 14 (See Fig, 1) in reference to ~~the~~ magnetization time, ~~the~~ quantity of used water, and other conditions. ~~In the case where much water is in use, t~~The magnetization time ~~is~~may be shortened, and the operation cycle of said circulatory pump ~~is~~ lessened, to keep said water tank ~~always~~ full of magnetized water.

Said chamber 4 may also include coil 20 and a shielding screen. A power supply section, a control section, a time measuring section, a temperature sensing section, a counter-electromotive force cut-off circuit, etc., may also be included as described previously. Redundant detailed descriptions of construction and operation are omitted as they are the same as in Embodiment Examples 1 and 2.

Fig. 5 shows an arrangement of a compressor, a condenser, a cooling fan, etc., inside said cooling chamber 34 formed in the lower part of said case 30. The embodiment may also include a cooling fan inside aforesaid magnetizing chamber.

An embodiment may also include castors (not shown its the drawings) under said case 30 for smooth movement of equipment. Additionally, said control section can be attached to the front or a side of said case 30 for handy operation of the device.

~~Therefore, according to the~~A device for production of magnetized water in this ~~example~~embodiment ~~it is made possible for all times for people readily to drink~~may provide magnetized water through said faucet 38~~, as it is in the case of the water purifier to serve~~for both cold and hot drinking water in the home or offices.

The physicochemical properties of ~~the~~ magnetized water produced by the embodiments of a device as described above~~of the present invention~~ are described below on the bases of ~~its~~ experiments. The magnetized water used in the experiments was ~~the water~~ produced ~~of~~from deionized distilled water sealed in an airtight glass bottle inside said chamber described above. ~~(in Embodiment Examples 1 and 2 of the present invention).~~

~~First, to speak of t~~The magnetic relaxation time~~, a phenomenon of its increase~~ was observed through NMR analysis.~~,~~ ~~when i~~Irradiation of the water, with a magnetism pulsating at 7 Hz and ~~with~~ an intensity ~~of~~between about 600~ to about 1,000 gauss, continued for 24 hours.~~,~~ ~~while t~~The temperature of said chamber 4 was substantially maintained~~kept~~ at about 30°C.

In Figs. 6 and 7, the vertical and lateral axes respectively show the time required for magnetization of deionized distilled water and the time T corresponding with the time for the changes of the gaps between the hydrogen atom pairs in the molecules of deionized water. Time T serves as indices to the magnetic relaxation times.

As seen in Fig. 6, the magnetic relaxation time showed a sharp increase for the first five hours and a mild rise after eight hours. ~~to~~ It reached its highest rate at ~~the~~about the 12th hour since ~~the~~ irradiation ~~had~~ started, after which ~~but thereafter~~ the rise became more sluggish ~~and continued so~~ until the 24th hour. The ~~thus increasing~~ magnetic relaxation ~~began~~ decreased ~~finally to stop~~ exponentially and functionally, as shown in Fig. 7, ~~as~~ after ~~the~~ irradiation was discontinued. The decrease was sudden and sharp for the first five hours after discontinuation of ~~the~~ irradiation, and continued ~~its~~a sluggish decrease ~~for the hours~~ until the 24th hour.

~~In Figs. 6 and 7, the vertical and lateral axes respectively show the time required for magnetization of deionized distilled water and the time T corresponding with the time for the changes of the gaps between the hydrogen atom pairs in the molecules of deionized water. Here, the time T serves as indices to the magnetic relaxation times.~~

~~Meanwhile, a~~As shown in Fig. 8, the magnetic relaxation time for the magnetized deionized distilled water ~~was greatly~~substantially increased to 2,453.3 ± 3.21 ms from ~~the~~ 2,261.7 ± 4.56 ms for ordinary deionized distilled water., ~~while it~~ The magnetic relaxation time increased ~~just a little bit~~ to 2,243 ± 1.31 ms, when the magnetized deionized distilled water had 1.0% potassium chloride (KCl) dissolved in it ~~by contrast with the~~compared to 2,118 ± 7.61 ms for ordinary deionized distilled water with 0.5% sodium chloride (NaCl) dissolved in it.

~~As for viscosity of the magnetized water, t~~The deionized distilled water magnetized for 24 hours showed, as in Fig. 9a, a very rapid initial increase in viscosity ~~in the initial period of time,~~ compared with ordinary deionized distilled water., ~~but~~ tThe ~~thus~~ quickly increased viscosity ~~got~~ decreased to the level of ~~the latter~~ordinary deionized distilled water at about the 12th hour.

~~A~~The change ~~of~~in viscosity ~~like this in water~~ became more distinct when sodium chloride (NaCl) and potassium chloride (KCl) were each added to the water, as shown in Figs. 9b through 9f.

As seen in Figs. 9b ~~through~~and 9c~~f~~, ordinary deionized distilled water ~~first~~ showed an initial decrease in viscosity as the added sodium chloride (NaCl) was increased by 0.1M~~,~~ and 0.2M, respectively.~~but later came to normal, while, in the case of t~~The magnetized deionized distilled water~~, it~~ showed an initial decrease in viscosity ~~in the earlier stage~~ when the sodium chloride (NaCl) was added by 0.1M, ~~only~~ but showed ~~almost~~substantially no ~~phenomenon of its~~initial decrease ~~in the initial period~~ when the sodium chloride (NaCl) was added by 0.2M ~~and 0.4M~~.

~~Yet, a~~As shown in Figs. 9d through 9f, an ~~phenomenon of~~ initial increase in viscosity was prominent ~~when, to~~in the magnetized deionized distilled water~~,~~ when potassium chloride (KCl) was added by 0.1M, 0.2M, and 0.4M~~,~~ ~~and~~ t~~T~~his increase in viscosity was especially prominent when ~~the addition was by~~ 0.1M of KCl was added~~to continue~~ until about 2,000 minutes~~,~~ ~~a~~After about 2,000 minutes~~which~~, ~~characteristically,~~ ~~it~~the increase in viscosity ~~started~~ quickly ~~to~~ returned to the level of ordinary deionized distilled water~~.~~; ~~w~~When 0.2M of ~~potassium chloride (~~KCl~~)~~ was added~~,~~ ~~by 0.2M in dissolution~~ the initial increase in viscosity persisted until about 4,000 minutes~~,~~ ~~and~~ ~~w~~When ~~the addition was raised to~~ 0.4M of KCl was added, the initial increase persisted until about 6,000 minutes.

~~As for conductivity, it was seen that i~~In ~~the cases of~~ both the magnetized water and the ordinary deionized distilled water, conductivity considerably decreased~~,~~ ~~while i~~In ~~the cases of the~~ water purified of ordinary fresh water and ~~the~~in tap water, the decrease in conductivity was less. When sodium chloride and potassium chloride were added by 0.01% in dissolution, however, the conductivity instantly increased as shown in Figs. 10a and 10b~~,~~ ~~and~~ t~~T~~he duration of the increased conductivity was slightly ~~the~~ more in the case of potassium chloride ~~added~~ than of sodium chloride. This phenomenon ~~is~~may be interpreted to mean that, in the case of ordinary water, NaCl or KCl is ionized

and quickly rearranged along with the molecules of water.~~,~~ However, ~~while~~ in the case of magnetized water, a sodium ion (Na^+) or potassium ion (K^+) instantly separates to deter the rise of conductivity~~,~~ because the molecules of water are in close arrangement by ~~virtue of its~~ strong hydrogen bonding.

~~Next, as to t~~The maximum solubility speed~~, when that~~ of ~~each~~ NaCl and KCl in water was measured ~~by the use of~~with a Sephadex G-50 column in order to see the reaction speed of the solvent and solute.~~,~~ ~~t~~The maximum solubility~~tion~~ speed of NaCl ~~was~~, as shown in Fig. 11a, ~~remarkably~~ substantially decreased in the case of the magnetized deionized distilled water ~~than in the case of~~compared to ordinary deionized distilled water.~~, the latter being shown in a dot line;~~ ~~t~~The difference in maximum solubility~~tion~~ speeds of ordinary deionized distilled water and magnetized water became smaller ~~finally to come to almost equal~~ as the condensation of NaCl approached ~~its~~ saturation. ~~Meanwhile, t~~The maximum solubility~~tion~~ speed of KCl increased in the magnetized deionized distilled water slightly more than in ordinary deionized distilled water, as shown~~is indicated by a dot line~~ in Fig. 11b.~~, but~~ ~~t~~The difference in maximum solubility speeds of ordinary deionized distilled water and magnetized water disappeared as the condensation of KCl increased to approach ~~its~~ saturation.

~~Again, as to the pattern of crystal formation in gypsum, NaCl, and KCl, it was learned that~~Experiments also showed that the structural composition of crystal formation in gypsum was denser and more compact when the gypsum was hardened ~~by the use of the~~with magnetized deionized distilled water ~~than of~~compared to being hardened with ordinary deionized distilled water.~~, and~~ ~~t~~The larger crystal construction was obtained ~~the~~ faster using magnetized deionized distilled water compared to using ordinary deionized distilled water~~in the former than in the latter case~~. When NaCl or KCl was added by 1% and 5%, the magnetized deionized distilled water formed ~~by far the~~substantially denser, larger crystal constructions than did ordinary deionized distilled water.

In Fig. 12, (1) in the lateral axis indicates the case of ordinary water, (2) of ordinary water exposed to atmosphere for six hours, (3) of ordinary water exposed for 12

hours, (4) of the deionized distilled water magnetized for six hours, and (5) of the deionized distilled water magnetized for 12 hours. The vertical axis shows the oxygen solubility. ~~Then, as to the magnetized water's oxygen solubility, a~~As seen in Fig. 12, the oxygen solubility of magnetized deionized distilled water~~it~~ was ~~decreased~~lower ~~the more as magnetization went on in the case of the magnetized deionized distilled water~~ than ~~in the case~~the oxygen solubility of ordinary deionized distilled water. ~~. In especial, from the vessel where the magnetization took place in a tight closure quite a quantity of gaseous substance was observed escaping.~~ When natural fresh water was magnetized, ~~too,~~ the hydrogen solubility was also lower~~decreased~~.

~~In Fig. 12, the number 1 in the lateral axis indicates the case of ordinary water, 2 of ordinary water exposed to atmosphere for six hours, 3 of ordinary water exposed for 12 hours, 4 of the deionized distilled water magnetized for six hours, and 5 of the same, magnetized for 12 hours, while the numbers in the vertical axis shows the oxygen solubility.~~

In Fig. 13, (1) in the lateral axis indicates the case of ordinary deionized distilled water, (2) of ordinary deionized distilled water magnetized for six hours, (3) of ordinary deionized distilled water magnetized for three hours, (4) of tap water, and (5) of natural fresh water. The vertical axis indicates the optical density (OD) as a measure of the ~~As to~~ free radical activity of the magnetized water~~.~~, ~~,~~ aAs shown in Fig, 13, the coloring reaction of the water by p-nitro-phenylacetate ~~was the less~~showed a lower OD in the case of the magnetized water ~~than in the comparable~~compared to ordinary deionized distilled water~~.~~, ~~and~~ tThe difference between the OD of ordinary deionized distilled water and the magnetized water became ~~bigger~~smaller as magnetization proceeded.

~~In Fig. 13, the number 1 in the lateral axis indicates the case of ordinary deionized distilled water, 2 of the same water magnetized for six hours, 3 of the same magnetized for three hours, 4 of tap water, and 5 of natural fresh water, while the numbers in the vertical axis indicate the optical density, OD.~~

~~Finally, as to t~~The polymerase chain reaction (PCR) and the enzymatic reaction of restriction endonuclease by the use of the magnetized water showed ~~it was learned~~ that ~~the~~ production of DNA increased in the PCR which used the magnetized water~~,~~ compared ~~with where the comparable~~to ordinary deionized distilled water ~~was used~~. When Taq (thermos aquatious) was gradually decreased~~, too~~, the PCR products slightly increased ~~where~~when ~~the~~ magnetized water was used~~,~~ compared ~~with where the~~to when ~~comparable~~ ordinary deionized distilled water was used.~~,~~ ~~and w~~When template DNA was gradually decreased, a ~~phenomenal~~substantial increase of PCR products was ~~confirmed~~ observed where~~in the case of~~ the magnetized water was used~~than in the other~~.

~~Meanwhile, in t~~The enzymatic reaction activity of restriction endonuclease~~, too,~~ ~~it~~ was also ~~observed~~ greater in the case of the magnetized water than ~~in the comparable~~compared to ordinary deionized distilled water.

INDUSTRIAL APPLICABILITY

As ~~has been~~ described above, ~~when~~application of the device for magnetizing water and the method ~~therefor are applied, it is possible to~~ may be used to rearrange the molecules of water by the use of a pulsating magnetic field, even without the aid of other inorganic salts.~~,~~ ~~and this way~~ Magnetizing water may~~it is possible to~~ facilitate formation of clusters of water molecules for its enrichment and, moreover, to maintain such characteristic properties of the magnetized water for some time (6-24 hours).~~,~~ ~~which invariably helps~~As such, obtainment of magnetized water~~, which~~ does not merely activate provision of nutrients demanded by living bodies but also stimulates their metabolism ~~also~~.

Further modifications and alternative embodiments of various aspects of the invention will be apparent to those skilled in the art in view of this description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the general manner of carrying out the invention. It is to be understood that the forms of the invention shown and described herein are to be

taken as examples of embodiments. Elements and materials may be substituted for those illustrated and described herein, parts and processes may be reversed, and certain features of the invention may be utilized independently, all as would be apparent to one skilled in the art after having the benefit of this description of the invention. Changes may be made in the elements described herein without departing from the spirit and scope of the invention as described in the following claims.

ABSTRACT

~~The objective of the present invention is to provide both a~~A device and a method ~~therewith~~ for ~~efficient~~ production of magnetized water ~~useful in living body's metabolism~~ by changing the arrangement of molecules of water~~,~~ take~~s~~~~ing~~ advantage of the phenomenon that molecules of water ~~are disposed to~~ form clusters and become enriched in a pulsating magnetic field. ~~To achieve the objective, t~~The device ~~of the present invention comprises~~may include a chamber~~,~~ ~~which is shaped like a vessel~~ for placing a container of purified water ~~to be laid in it and which is~~, wound with coils of wire ~~on its outer wall for~~ a ~~certain~~ predetermined number of rounds; a means of supplying power to convert ~~the~~ originally supplied alternating current of electricity into pulsating direct current signals ~~of a certain frequency~~ and impress them on said coils for induction of a pulsating magnetic field to said chamber; a means of cooling~~, installed on the outer side of said chamber to cool the heat generated by~~ said ~~coils~~chamber; a means of sensing ~~the~~ changes in ~~the~~ temperature ~~generated by~~ of said coils; a means of measuring time to gauge the time of magnetization of said purified water; and a means of control to stop ~~the~~ input~~ting~~ of direct current pulsating signals ~~at the moment~~ when~~, measured by said means of measuring time,~~ the time spent on magnetizing has reached ~~its~~a preset time.